

ELECTRICALLY HEATED SYSTEMS

TABLE OF CONTENTS

	page		page
GENERAL INFORMATION		DIAGNOSIS AND TESTING	
INTRODUCTION	1	DEFOGGER SYSTEM	2
REAR WINDOW DEFOGGER SYSTEM	1	REAR GLASS HEATING GRID	3
HEATED MIRROR SYSTEM	1	DEFOGGER SWITCH.....	3
DESCRIPTION AND OPERATION		SERVICE PROCEDURES	
REAR GLASS HEATING GRID	2	REAR GLASS HEATING GRID REPAIR.....	4
OUTSIDE MIRROR HEATING GRID	2	REMOVAL AND INSTALLATION	
DEFOGGER SWITCH.....	2	DEFOGGER SWITCH.....	5

GENERAL INFORMATION

INTRODUCTION

An electrically heated rear window defogger is an available factory-installed option on quad cab versions of this model. Electrically heated outside rear view mirrors are an available factory-installed option on quad cab models that are also equipped with the electrically heated rear window defogger. Refer to 8W-48 - Rear Window Defogger and 8W-62 - Power Mirrors in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

REAR WINDOW DEFOGGER SYSTEM

The rear window defogger system is an available option on quad cab versions of this model. The rear window defogger system will only operate when the ignition switch is in the On position. When the defogger switch is in the On position, an electric heater grid on the rear window glass is energized. Vehicles with the heated mirrors option also have heater grids located behind the outside rear view mirror glass. Each of these grids produce heat to help clear the rear window glass and outside rear view mirrors of ice, snow, or fog. The electric heater grid produces heat to help clear the rear window glass of ice, snow, or fog.

The rear window defogger system is controlled by a momentary rear window defogger switch located in the instrument panel lower bezel. An amber indicator lamp in the switch bezel will light to indicate when the defogger system is turned on. The rear window defogger switch also contains the defogger system control circuitry including the timer logic and the defogger relay.

The rear window defogger system will be automatically turned off after a programmed time interval of about ten minutes. After the initial time interval has

expired, if the rear window defogger switch is turned on again during the same ignition cycle, the defogger system will be automatically turned off after about five minutes.

The rear window defogger system will automatically shut off if the ignition switch is turned to the Off position, or it can be turned off manually by depressing the rear window defogger switch a second time while the system is turned on. Following are general descriptions of the major components in the rear window defogger system. Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of the rear window defogger system.

HEATED MIRROR SYSTEM

The heated mirror system is available on quad cab models of this vehicle that are also equipped the optional rear window defogger system. The heated mirror system will only operate when the ignition switch is in the On position. When the rear window defogger switch is in the On position, an electric heater grid located behind the glass of each of the outside rear view mirrors is energized. When energized, each of these heater grids produce heat to help clear the outside rear view mirrors of ice, snow, or fog.

The heated mirror system is controlled by a momentary rear window defogger switch located in the instrument panel lower bezel. An amber indicator lamp in the switch bezel will light to indicate when the defogger system is turned on. The rear window defogger switch also contains the rear window defogger system control circuitry including the timer logic and the defogger relay.

The heated mirror system only operates in concert with the rear window defogger system, and will be automatically turned off after a programmed time

GENERAL INFORMATION (Continued)

interval of about ten minutes. After the initial time interval has expired, if the rear window defogger switch is turned on again during the same ignition cycle, the heated mirror system will automatically turn off after about five minutes.

The heated mirror system will automatically shut off if the ignition switch is turned to the Off position, or it can be turned off manually by depressing the rear window defogger switch a second time while the system is turned on. Following are general descriptions of the major components in the heated mirror system. Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of the heated mirror system.

DESCRIPTION AND OPERATION

REAR GLASS HEATING GRID

The heated rear window glass has two electrically conductive vertical bus bars and a series of horizontal grid lines made of a silver-ceramic material, which is baked on and bonded to the inside surface of the glass. The grid lines and bus bars comprise a parallel electrical circuit.

When the rear window defogger switch is placed in the On position, electrical current is directed to the rear window grid lines through the bus bars. The grid lines heat the rear window to clear the surface of fog or snow. Protection for the heating grid circuit is provided by a fuse in the Power Distribution Center (PDC).

The grid lines and bus bars are highly resistant to abrasion. However, it is possible for an open circuit to occur in an individual grid line, resulting in no current flow through the line.

The grid lines can be damaged or scraped off with sharp instruments. Care should be taken when cleaning the glass or removing foreign materials, decals, or stickers from the glass. Normal glass cleaning solvents or hot water used with rags or toweling is recommended.

A repair kit is available to repair the grid lines and bus bars, or to reinstall the heated glass terminals.

OUTSIDE MIRROR HEATING GRID

Vehicles equipped with the optional heated mirror system have an electric heating grid located behind the mirror glass of each outside rear view mirror. The heated mirrors are controlled by the rear window defogger switch. Electrical current is directed to the heating grid inside the mirror only when the rear window defogger switch is in the On position.

If the outside mirror heating grids are both inoperative, see Rear Window Defogger System in the Diagnosis and Testing section of this group. If only one of

the outside mirror heating grids is inoperative, see Power Mirror System in the Diagnosis and Testing section of Group 8T - Power Mirror Systems for diagnosis of the outside mirror heating grid.

The heating grid behind each outside mirror glass cannot be repaired and, if faulty or damaged, the entire power mirror unit must be replaced. Refer to Power Mirror in the Removal and Installation section of Group 8T - Power Mirror Systems for the service procedures.

DEFOGGER SWITCH

The rear window defogger switch is installed in the instrument panel lower bezel, which is located near the center of the lower instrument panel, below the heater and air conditioner controls. The rear window switch pod also contains the rear window defogger logic and timer circuitry, an amber defogger indicator lamp, the rear window defogger relay and a switch illumination lamp. The indicator and illumination lamps in the switch have incandescent bulbs, which can be serviced.

The momentary-type rear window defogger switch provides a hard wired ground signal to the rear window defogger logic and timer circuitry, each time it is depressed. The rear window defogger timer and logic circuitry responds by energizing or de-energizing the rear window defogger relay and the amber defogger indicator lamp, which lights to indicate when the defogger system is turned On. Energizing the rear window defogger relay provides electrical current to the rear window defogger grid.

The rear window defogger switch cannot be repaired. If any function of the switch except lighting is faulty or damaged, the entire switch unit must be replaced.

DIAGNOSIS AND TESTING

DEFOGGER SYSTEM

For circuit descriptions and diagrams, refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams. The operation of the electrically heated rear window defogger system can be confirmed in one of the following manners:

1. Turn the ignition switch to the On position. While monitoring the instrument panel voltmeter, set the defogger switch in the On position. When the defogger switch is turned On, a distinct voltmeter needle deflection should be noted.

2. Turn the ignition switch to the On position. Set the defogger switch in the On position. The rear window defogger operation can be checked by feeling the rear window or outside rear view mirror glass. A distinct difference in temperature between the grid lines

DIAGNOSIS AND TESTING (Continued)

and the adjacent clear glass or the mirror glass can be detected within three to four minutes of operation.

3. Using a 12-volt DC voltmeter, contact the rear glass heating grid terminal A (right side) with the negative lead, and terminal B (left side) with the positive lead (Fig. 1). The voltmeter should read battery voltage.

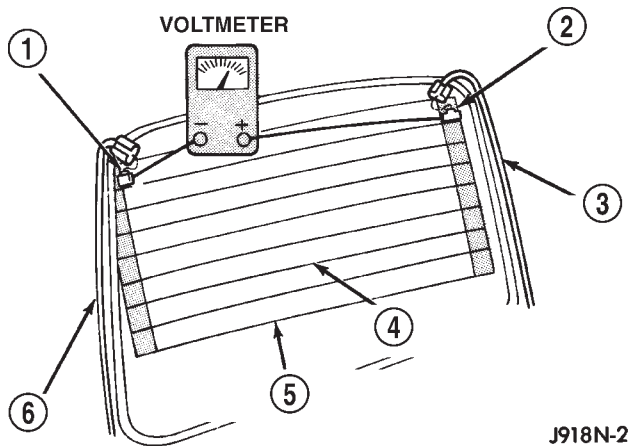


Fig. 1 Rear Window Glass Grid Test - Typical

- 1 - TERMINAL "A"
- 2 - TERMINAL "B"
- 3 - FEED WIRE
- 4 - MID-POINT "C" (TYPICAL)
- 5 - HEATED REAR WINDOW DEFOGGER GRID
- 6 - GROUND WIRE

The above checks will confirm system operation. Illumination of the defogger switch indicator lamp means that there is electrical current available at the output of the rear window defogger logic and timer circuitry, but does not confirm that the electrical current is reaching the rear glass heating grid lines.

If the defogger system does not operate, the problem should be isolated in the following manner:

(1) Confirm that the ignition switch is in the On position.

(2) Ensure that the rear glass heating grid feed and ground wires are connected to the glass. Confirm that the ground wire has continuity to ground.

(3) Check the fuses in the Power Distribution Center (PDC) and in the junction block. The fuses must be tight in their receptacles and all electrical connections must be secure.

When the above steps have been completed and the rear glass heating grid is still inoperative, one or more of the following is faulty:

- Rear window defogger switch
- Rear window grid lines (all grid lines would have to be broken or one of the feed wires disconnected for the entire system to be inoperative).

If setting the defogger switch to the On position produces a severe voltmeter deflection, check for a

short circuit between the rear window defogger switch defogger relay output and the rear glass heating grid.

REAR GLASS HEATING GRID

For circuit descriptions and diagrams, refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams. To detect breaks in the grid lines, the following procedure is required:

(1) Turn the ignition switch to the On position. Set the defogger switch in the On position. The indicator lamp should light. If OK, go to Step 2. If not OK, see Defogger Switch in the Diagnosis and Testing section of this group.

(2) Using a 12-volt DC voltmeter, contact the vertical bus bar on the right side of the vehicle with the negative lead. With the positive lead, contact the vertical bus bar on the left side of the vehicle. The voltmeter should read battery voltage. If OK, go to Step 3. If not OK, repair the open circuit to the defogger relay as required.

(3) With the negative lead of the voltmeter, contact a good body ground point. The voltage reading should not change. If OK, go to Step 4. If not OK, repair the circuit to ground as required.

(4) Connect the negative lead of the voltmeter to the right side bus bar and touch each grid line at midpoint C with the positive lead. A reading of approximately six volts indicates a line is good. A reading of zero volts indicates a break in the grid line between midpoint C and the left side bus bar. A reading of ten to fourteen volts indicates a break between midpoint C and the right side bus bar. Move the positive lead on the grid line towards the break and the voltage reading will change as soon as the break is crossed.

DEFOGGER SWITCH

For complete circuit diagrams, refer to 8W-48 - Rear Window Defogger in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable. Remove the lower bezel from the instrument panel and disconnect the instrument panel wire harness connector from the rear window defogger switch connector receptacle.

DIAGNOSIS AND TESTING (Continued)

(2) Check for continuity between the ground circuit cavity of the instrument panel wire harness connector for the rear window defogger switch and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open ground circuit to ground as required.

(3) Reconnect the battery negative cable. Check for battery voltage at the fused B(+) circuit cavity of the instrument panel wire harness connector for the rear window defogger switch. If OK, go to Step 4. If not OK, repair the open fused B(+) circuit to the fuse in the Power Distribution Center (PDC) as required.

(4) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity of the instrument panel wire harness connector for the rear window defogger switch. If OK, go to Step 5. If not OK, repair the open fused ignition switch output (run) circuit to the fuse in the Junction Block (JB) as required.

(5) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Reconnect the instrument panel wire harness connector to the rear window defogger switch connector receptacle. Reconnect the battery negative cable. Turn the ignition switch to the On position. Back probe the rear window defogger relay output circuit cavity of the instrument panel wire harness connector for the rear window defogger switch. Depress and release the rear window defogger switch button. There should be battery voltage. Depress and release the rear window defogger switch button again. There should be zero volts. If OK, go to Step 6. If not OK, replace the faulty rear window defogger switch.

(6) Depress and release the rear window defogger switch button. The rear window defogger indicator lamp should light. If the indicator lamp does not light, replace the bulb with a known good unit and test again. If the lamp is still inoperative, replace the faulty rear window defogger switch.

SERVICE PROCEDURES

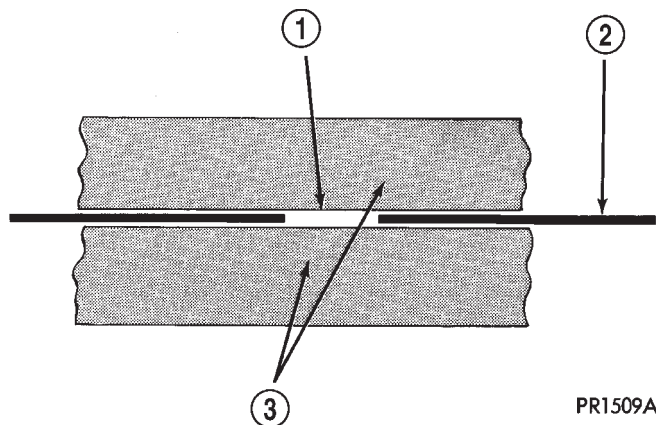
REAR GLASS HEATING GRID REPAIR

Repair of the rear glass heating grid lines, bus bars, terminals or pigtail wires can be accomplished using a Mopar Rear Window Defogger Repair Kit (Part Number 4267922) or equivalent.

WARNING: MATERIALS CONTAINED IN THE REPAIR KIT MAY CAUSE SKIN OR EYE IRRITATION. THE KIT CONTAINS EPOXY RESIN AND AMINE TYPE HARDENER, WHICH ARE HARMFUL IF SWALLOWED. AVOID CONTACT WITH THE SKIN AND EYES. FOR SKIN CONTACT, WASH THE AFFECTED AREAS WITH SOAP AND WATER. FOR CONTACT WITH THE EYES, FLUSH WITH PLENTY OF WATER.

DO NOT TAKE INTERNALLY. IF TAKEN INTERNALLY, INDUCE VOMITING AND CALL A PHYSICIAN IMMEDIATELY. USE WITH ADEQUATE VENTILATION. DO NOT USE NEAR FIRE OR FLAME. CONTAINS FLAMMABLE SOLVENTS. KEEP OUT OF THE REACH OF CHILDREN.

(1) Mask the repair area so that the conductive epoxy can be applied neatly. Extend the epoxy application onto the grid line or the bus bar on each side of the break (Fig. 2).



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Fig. 2 Grid Line Repair - Typical

- 1 - BREAK
- 2 - GRID LINE
- 3 - MASKING TAPE

(2) Follow the instructions in the repair kit for preparing the damaged area.

(3) Remove the package separator clamp and mix the two conductive epoxy components thoroughly within the packaging. Fold the package in half and cut the center corner to dispense the epoxy.

(4) For grid line repairs, mask the area to be repaired with masking tape or a template.

(5) Apply the epoxy through the slit in the masking tape or template. Overlap both ends of the break by at least 19 millimeters (0.75 inch).

(6) For a terminal or pigtail wire replacement, mask the adjacent areas so the epoxy can be extended onto the adjacent grid line as well as the bus bar. Apply a thin layer of epoxy to the area where the terminal or pigtail wire was fastened and onto the adjacent grid line.

(7) Apply a thin layer of conductive epoxy to the terminal or bare wire end of the pigtail and place it in the proper location on the bus bar. To prevent the terminal or pigtail wire from moving while the epoxy is curing, it must be wedged or clamped.

(8) Carefully remove the masking tape or template.

SERVICE PROCEDURES (Continued)

CAUTION: Do not allow the glass surface to exceed 204° C (400° F) or the glass may fracture.

(9) Allow the epoxy to cure 24 hours at room temperature, or use a heat gun with a 260° to 371° C (500° to 700° F) range for fifteen minutes. Hold the heat gun approximately 25.4 centimeters (10 inches) from the repair.

(10) After the conductive epoxy is properly cured, remove the wedge or clamp from the terminal or pig-tail wire. Do not attach the wire harness connectors until the curing process is complete.

(11) Check the operation of the rear window defogger glass heating grid.

REMOVAL AND INSTALLATION

DEFOGGER SWITCH

REMOVAL

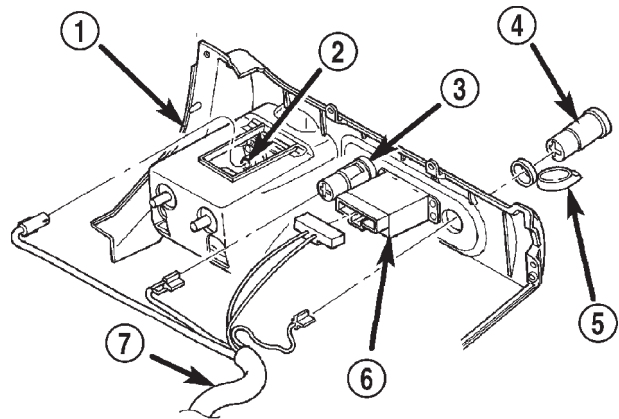
WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument panel lower bezel from the instrument panel. Refer to **Instrument Panel Lower Bezel** in the index of this service manual for the location of the proper instrument panel lower bezel removal procedures.

(3) Remove the two screws that secure the rear window defogger switch to the back side of the instrument panel lower bezel (Fig. 3).

(4) Remove the rear window defogger switch from the instrument panel lower bezel.



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Fig. 3 Rear Window Defogger Switch Remove/Install

- 1 – INSTRUMENT PANEL LOWER BEZEL
- 2 – ASH RECEIVER LAMP
- 3 – CIGAR LIGHTER
- 4 – POWER OUTLET
- 5 – CAP
- 6 – REAR WINDOW DEFOGGER SWITCH
- 7 – INSTRUMENT PANEL WIRE HARNESS

INSTALLATION

(1) Position the rear window defogger switch onto the instrument panel lower bezel.

(2) Install and tighten the two screws that secure the rear window defogger switch to the back side of the instrument panel lower bezel. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install the instrument panel lower bezel onto the instrument panel. Refer to **Instrument Panel Lower Bezel** in the index of this service manual for the location of the proper instrument panel lower bezel installation procedures.

(4) Reconnect the battery negative cable.

